

PATENT SPECIFICATION

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Improvements in Bottle Closures COMPLETE SPECIFICATION

We, INTER-SEAL CORPORATION, a Corporation organized and existing under the laws of the State of Delaware, United States of America, of Spring Lake, Monmouth County, State of New Jersey, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to protective closures for bottles and other containers, and is concerned more particularly with a protective closure having novel features which enable it to be readily applied to the top of a container, such as a bottle, and to be secured firmly in place without the use of spinning or similar machine operations.

The closure of the invention consists primarily of two co-operating parts, a cover or lary member and an outer locking sleeve, and may be manufactured in several different forms to include a simple cap with or without internal threads, or, for tamper-proof purposes alone, with a flat top to be applied as a protective structure over an ordinary closure such as a screw cap, a wood top cork, etc. In another form of the invention, the closure is made of molded plastic material and is of the non-refillable type having a valve, a float, etc. Once any form of the new closure is applied to a container, it is locked in place and cannot be removed without destruction of the locking sleeve. Accordingly, the closure in non-refillable form is especially advantageous, since the closure cannot be removed from an empty bottle, the bottle refilled, and the closure replaced. A non-refillable example of the new closure will, therefore, be illustrated and described in detail for purposes of explanation.

A typical non-refillable closure now in
(Price 2/8)

commercial use is shown in our British Patent No. 633,436 dated April 21, 1947, as including a valve casing entering the mouth of the bottle and having a rim overlying the end of the bottle, a chamber, which engages the rim of the casing, and a gasket seated on the end of the bottle around the rim. The chamber and casing are made of a molded plastic material, such as a synthetic resin, and the closure is held in place by means of a metal ferrule partially telescoped over the inner end of the chamber and having an internal flange at its outer end, which is embedded in the outer wall of the chamber. In the application of the closure to a bottle, the casing is inserted in the mouth of the bottle and the ferrule is telescoped over the end of the bottle. Pressure is then applied to the chamber to cause it to clamp the gasket and the rim of the casing tightly against the end of the bottle, and, while the pressure is maintained, the part of the ferrule telescoped over the neck of the bottle is spun by machine under a circumferential head, which forms part of the external finish of the bottle.

While the ferrule is an effective means for securing the closure in place on the bottle, the cost of the ferrule is an important item in the cost of the closure. Also, because of the spinning operation required, the machine and labor charge for application of the closure is substantial.

The present invention is, accordingly, directed to the provision of a novel closure for bottles, which affords all the advantages of similar closures utilising a metal attaching ferrule and is less expensive to produce and apply. The new closure includes a cover, which may be an ordinary cap or the chamber or like part in a closure of the non-refillable type is provided with a plurality of flexible tongues telescoping over the neck of the bottle, when the cover is in place thereon. The tongues are pro-

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vided near their ends with means engage-
able beneath a circumferential bead on the
bottle finish and the closure includes a
sleeve, which initially encircles the cover
5 and can be slipped along the tongues, after
the closure is in place on the bottle, to flex
the tongues inwardly. The tongues and
sleeve are also provided with interlocking
means, which prevent upward movement of
10 the sleeve, after it has been clipped down-
wardly sufficiently far to cause the tongues
to engage behind the bead.

For a better understanding of the inven-
tion, reference may be made to the accom-
15 panying drawing, in which

Fig. 1 is a vertical sectional view of one
form of the new closure applied to an up-
right bottle;

Fig. 2 is an elevational view of the
20 closure of Fig. 1 with parts broken away;

Fig. 3 is a view, partly in vertical section
and partly in elevation, of the new closure
as it is being applied to a bottle;

Fig. 4 is a sectional view on the line 4-4
25 of Fig. 1;

Fig. 5 is a view, partly in section and
partly in elevation and with parts broken
away, of a modified form of the closure;

30 Fig. 6 is a fragmentary view, partly in
section and partly in elevation, of another
form of the closure.

The closure illustrated in the drawing is
of the non-refillable type and it is adapted
35 for application to a bottle 10 having an
exterior finish, which includes an outer cir-
cumferential bead 11 and an inner circum-
ferential bead 12 of greater outside dia-
meter than bead 11. At the end of the neck
40 of the bottle, the wall is somewhat
thickened, as indicated at 13.

The closure comprises a cover 14 provid-
ing a chamber, from which leads a pouring
passage 15. A button or "fly trap" 16
45 lies within and closes the outer end of the
pouring passage, when the bottle is upright,
and the button has a stem 16a received in
a recess in the neck of a guard 17, which
extends downward from the button into the
50 chamber and has a hollow lower end of
conical outline. The guard is provided with
radial ribs 18, which extend from the top
of the neck down below the lower edge of
the conical portion.

55 The closure also includes a casing 19,
which enters the mouth of the bottle and
has a rim 19a overlying the end of the
bottle and resting upon a gasket 20 of resili-
ent material, which is seated upon the end
60 of the bottle. The casing has an opening at
its lower end surrounded by a valve seat
engageable by the gate member 21 of the
valve. Outwardly beyond the member 21
is a float 22 and a ball weight 23, the
65 latter extending partially into the hollow

inner end of the guard. When the bottle
is upright, the gate member 21 closes the
opening through the casing and supports
the float which, in turn, supports the ball
weight. The casing is provided with inter-
70 nal radial ribs 24, between which liquid
issuing from the opening through the cas-
ing may pass by the gate member and float.

The casing and cover are ordinarily made
of molded plastic material and the cover 75
is provided with a plurality of integral
tongues 25, which extend axially from its
inner periphery. Each tongue is provided
at its lower end with a transverse rib 25a
projecting inwardly, and another trans-
80 verse rib 25b is formed on the outer sur-
face of each tongue between its ends. A
sleeve 26 of plastic material encircles the
cover and is formed with an internal up-
standing shoulder 26a lying between its
85 ends. The outer part of the cover defining
the pouring passage is formed with a screw
thread 27 for engagement with the threads
of a cap not shown.

In the application of the closure to a 90
bottle, as shown in Fig. 3, the parts of the
closure are assembled with the rim 19a of
the casing lying within the lower end of
the cover. Gasket 20 lies within the tongues
25 against the lower end of the cover and 95
the rim 19a of the casing, and the sleeve is
positioned above the tongues which spring
outwardly to telescope the bottle neck. As
the closure is then moved toward the end
of the bottle with the casing 19 entering 100
the bottle mouth, the ribs 25a of the
tongues will snap over the bead 11. The
gasket 20 will now be seated on the bottle
top and then be subjected to pressure to
compress it in order to effect a tight joint 105
between the several parts.

The length of the tongues 25 is such that,
when the gasket is sufficiently compressed
against the end of the bottle in the appli-
cation of the closure, the internal ribs 25a 110
on the tongues will closely underlie the cir-
cumferential bead 11 of the bottle finish.
While the pressure on the closure to com-
press the gasket is maintained, the sleeve
26 is slid downwardly, and, as it rides over 115
the external ribs 25b of the tongues, the
ribs 25a are thrust against the bead 11,
and the central parts of the tongues are
forced inwardly into the space between the
enlarged end of the bottle and the bead 11. 120
As the downward movement of the sleeve
is continued, its shoulder 26a passes beyond
the ribs 25b and the tongues tend to
straighten out. Preferably, the propor-
tional dimensions are such that the internal 125
major diameter of the sleeve 26 above its
shoulder 26a is always less than the exter-
nal diameter between outer faces of the
external ribs 25b on a pair of oppositely
disposed tongues 25, when the closure is 130

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5 seated on a bottle prior to application of the sleeve. When this relationship is observed, the engagement of the outer faces of the ribs 25b with the inner surface of the sleeve, after the sleeve has been moved downwardly to cause its shoulder 26a to pass the ribs, will accomplish two purposes, (a) to cause the internal ribs 25a to press firmly against the head 11 of the bottle 10 finish and hold the compression of the gasket, and (b) to insure and maintain the effective locking engagement of the ribs 25b and the shoulder 26a due to the slight bowing of the tongues inwardly which causes them to reset outwardly, as clearly shown in Fig. 5. It is preferable to form the internal rib 25a on each tongue with an outer surface lying at an angle to the axis of the closure, so that the surface will make a good contact with the head 11 of the bottle 20 regardless of minor variations in the size of the head within manufacturing tolerances.

The passage of the internal shoulder 26a on the sleeve beyond the external ribs 25b on the tongues prevents return movement of the sleeve. The closure is thus locked on the bottle and the sleeve and tongues are interlocked in such manner that the closure cannot be removed without damage to or destruction of the sleeve. The attachment of the new closure to the bottle may, accordingly, be effected by a simple manual movement of the sleeve downwardly without the more complicated machine spinning operations, such as are employed in applying a closure with a metal ferrule to a bottle. The lower inside edge of the sleeve 26 is beveled, as also is the top surface of the ribs 25b and the lower inside surface of the ribs 25a, all of which facilitates the telescoping of the tongues over the bottle top, and the sliding of the sleeve into a locking position.

45 In the application of the cap to the closure, it is now common practice to make use of a cap, which consists of a circular panel and a cylindrical skirt. This cap is slipped over the threaded end of the sleeve and the skirt is then rolled to fit the closure surface, the skirt being provided with threads in the rolling operation. During the rolling of the skirt of the cap against the closure, the chamber of the 55 closure is subjected to torque, which may possibly cause it to slip angularly. In the new closure, such risk of slipping can be avoided by providing the bottle finish with an external lug 28 receivable into the space 60 between a pair of the tongues 25 on the cover of the closure. When the closure is applied to a bottle having such a lug, with the lug lying between a pair of tongues, the closure is held against angular movement, which might otherwise occur during

the rolling of the skirt of the cap.

In the construction shown in Fig. 1, the further downward movement of the sleeve 26 is arrested by the inner circumferential bead 12 on the bottle finish, although in a 70 container, such as a metal can, with a short neck, the body of the container would serve the same purpose. Preferably, the closure may be applied to a bottle independent of such a bead, the tongues 25' then being 75 provided at their lower ends with an external transverse rib 25c, which is similar to the internal rib 25a. The sleeve 26' used with the closure having such ribs is then the same in all respects as sleeve 26, and 80 the internal shoulder 26a' of sleeve 26' is spaced inward from the inner end of the sleeve a distance such that the shoulder has passed beyond the outer external rib 25b' on the tongues, when the lower end of the sleeve is in contact with the rib 25c on the 85 tongues.

The construction shown in Fig. 6 is similar to that shown in Fig. 5 except that the sleeve 29 is not provided with an internal shoulder. Such a sleeve may be 90 secured to the ribs by a suitable solvent applied to the bottom edge of the sleeve 29 just before the sleeve is applied, so as to secure it to the body tongues. 95

It will be apparent that the new closure is substantially cheaper than one provided with a metal ferrule for attachment to a bottle, since the tongues can be formed on the cover during the molding of the plastic 100 and the sleeve may be molded of plastic in a simple operation and is of negligible cost. In the application of the closure, the latter is locked to the bottle merely by moving the sleeve downwardly to the desired extent 105 and, therefore, no machine spinning operation is required.

In the drawing, each of the tongues 25 is shown as having ribs 25a and 25b, and, in Fig. 5, 25c in addition. This is not essential. For example, if required for molding purposes, ribs 25c may be omitted on alternate tongues, and ribs 25b' may be omitted on intervening tongues having the terminal ribs 25c. Likewise, if the tongues were 115 made of sheet metal, obviously alternate ones would be bent inwardly to form the equivalent of ribs 25a, and intervening ones outwardly to form the equivalent of ribs 25c. 120

Relatively small dimensional variations, due to manufacturing tolerances, particularly in glassware, are compensated for in a vertical direction by corresponding variations in the degree to which the gasket is 125 compressed. Likewise, those tolerances that are present transversely, simply change to a minor degree the extent of flexure of the tongues 25, such as with bottles of major and minor top diameters, upon which the 130

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closure is being applied.

What we claim is:—

1. A closure for a bottle formed with an exterior finish on the neck including at least one circumferential bead lying downward from the end of the neck, which comprises a cover mounted on the end of the neck, characterised in that the cover is provided with integral tongues, which extend downward from the lower edge of the cover along the outside of the neck of the bottle parallel to the axis of the neck and have internal projections adjacent their lower ends engaged beneath the bead and external projections upward from their lower ends, a continuous one-piece sleeve of cylindrical form is telescoped over the cover to enclose the tongues and has an internal diameter adjacent its lower end substantially the same as the external diameter of the group of tongues, whereby the sleeve holds the tongues against withdrawal of their internal projections from beneath the bead, and means are provided to hold the sleeve against upward movement relative to the tongues.

2. A closure as defined in Claim 1. in

which the means for holding the sleeve against upward movement relative to the tongues include an internal shoulder formed on the sleeve and lying below the external projections on the tongues.

3. A closure as defined in Claim 1, in which some of the tongues have external projections adjacent their lower ends limiting the downward movement of the sleeve.

4. A closure as defined in Claim 1, in which the finish of the bottle neck includes a lug lying upward from the circumferential bead and a pair of tongues on the cover lie on opposite sides of the lug and cooperate therewith to prevent rotational movement of the cover on the bottle neck.

5. A closure as defined in Claim 1, in which the internal projections on the tongues are transverse ribs and the upper surface of each rib is inclined outwardly relative to the axis of the bottle neck in an upward direction.

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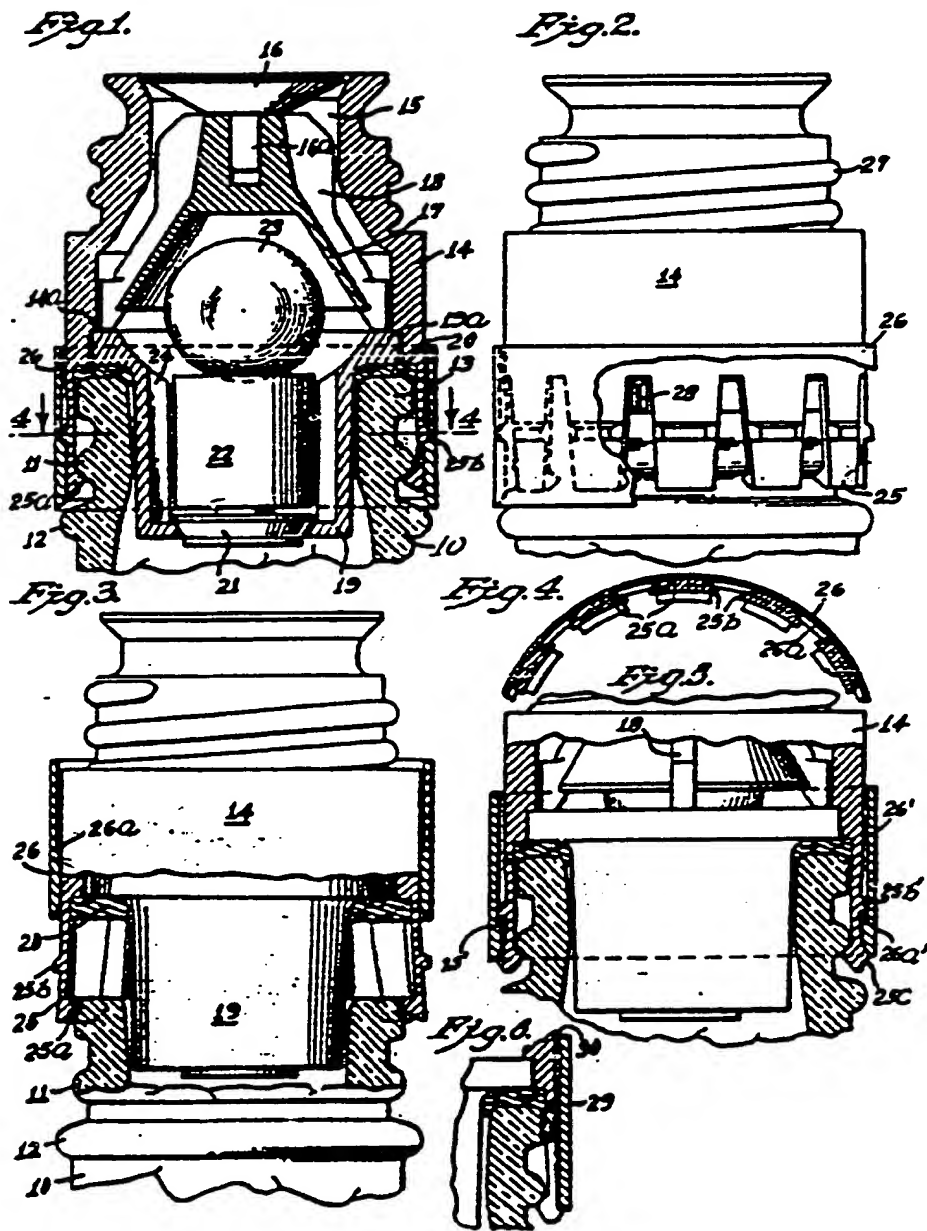
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1 SHEET

This drawing is a reproduction of the Original on a reduced scale.



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